

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Swarn S. Kalsi  
Serial No. : 09/371,692  
Appeal No. : 2005-0145  
Filed : August 10, 1999  
Title : SUPERCONDUCTING ELECTRIC MOTOR

Art Unit : 2834  
Examiner : G. Perez

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**RESPONSE TO DOCKETING REMINDER**

In response to the Docketing Notice mailed on November 8, 2004, Applicant draws attention to the filing of a reply brief on March 12, 2003 and a request for oral hearing on March 12, 2003.

Enclosed, for the Board's convenience is a copy of the reply brief and the request for oral hearing, showing the certificate of mailing. Also enclosed is a copy of the postcard date stamped by the PTO.

Applicant looks forward to consideration of the arguments set forth in the reply and to an opportunity to address the Board in the oral hearing.

No additional fees are believed to be due in connection with the filing of this response. However, to the extent fees are due, or if a refund is forthcoming, please adjust our deposit account 06-1050, referencing attorney docket "05770-082001."

Respectfully submitted,

Date: November 15, 2004

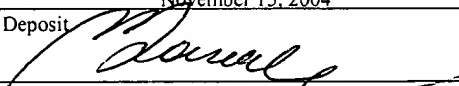


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| Application No.<br><b>09/371,692</b>  | Filing Date<br>August 10, 1999 | Attorney/Secretary Init<br>FRO/FAL/cfo |   |
| Title of the Invention<br><b>SUPERCONDUCTING ELECTRIC MOTOR</b>   |                                |  |   |
| Applicant<br><b>Swarn S. Kalsi</b>  |                                |  |   |
| Enclosures<br>· Reply Brief (4 pages)<br>· Other: Request for Oral Hearing (1 page)<br>A Check for \$280.00 |                                |  |   |

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**REPLY BRIEF**

Pursuant to 37 CFR 1.193(b)(1), Applicant responds to the new points raised in the Examiner's Answer as follows.

**A STACK OF DISKS IS NOT A WINDING**

On page 12 of the Answer, the Examiner correctly points out that windings need not be wire. While this may be true, it does not change the fact that *Rabinowitz* teaches a rotor having a stack of three superconducting disks.<sup>1</sup> A stack of superconducting disks does not form a "superconducting winding" any more than a stack of pennies forms a copper winding.

On page 11 of the Answer, the Examiner suggests that although *Rabinowitz* ruled out a rotor having "wire-shaped" windings, he did not, in so doing, rule out the possibility of a rotor with other types of windings.

There are at least three difficulties with this point of view:

1. It fails to account for the *Rabinowitz* statement that "the motor/generator has *only* a primary set of windings"<sup>2</sup>; and

<sup>1</sup> See FIG. 1 and FIG. 2, *Rabinowitz*, col. 7, lines 4-7 ("Although rotor 11 can contain as little as a single layer of superconducting material, in order to increase the amount of superconducting material in the rotor, it is preferred to have several layers 12.") Applicant uses the word "stack" despite its vertical connotation since, in any event, there is no external reference frame in the figures to define which way is up.

<sup>2</sup> *Rabinowitz*, col. 5, lines 58-60 ("[b]ecause this motor/generator has *only* a primary set of windings, it is simpler in some ways than most motor/generators.").

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*Carla F. Opadile*

2. It fails to explain why FIGS. 1-8 show rotors with superconducting disks, rather than rotors having "non wire-shaped" windings.<sup>3</sup>
3. It fails to account for the absence of any discussion, in what should be an enabling disclosure, of these "non wire-shaped" windings.

In Applicant's view, the cited passage<sup>4</sup> is simply one in which Rabinowitz draws attention to an advantage of his motor. Rabinowitz is pointing out that because his rotor is made by placing superconducting *disks* adjacent to each other, he can use any superconducting material at all. He is no longer restricted to choosing superconducting materials that can be formed into an elongated structure (i.e. wire, foil, thin film, tape) that is later wound into a winding. He avoids this restriction by avoiding windings altogether.

Unlike the Examiner's interpretation, Applicant's proposed interpretation of this passage offers the advantage of being consistent with points 1-3 above.

It is apparent that *Rabinowitz* teaches a rotor having superconducting disks. These superconducting disks cannot reasonably be characterized, either individually or collectively, as a winding. Accordingly, *Rabinowitz* lacks any teaching or suggestion of a rotor having a superconducting winding, as recited in the pending claims.

#### A SQUIRREL CAGE IS NOT A WINDING

On page 15 of the Answer, The Examiner correctly points out that a magnetic field will induce loops of current on a squirrel cage. It is, of course, well known that a magnetic field will induce loops of current in any metal structure that it encounters. This does not, however, make all metal structures into "windings."

The squirrel cage is not a winding at all. It is essentially a wire mesh, topologically no different from a tin can that has had long strips cut out from one end to the other to form the bars of a cage.

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<sup>3</sup> FIG. 9 illustrates a special case in which the superconducting material is on the stator instead of the rotor. The rotor windings in this case are conventional windings, not superconducting windings.

<sup>4</sup> *Rabinowitz* at col. 5, line 66 to col. 6, line 3, ("Because it is in a non-wire form, instead of one or more windings of wire, the motor/generator can be implemented with substantially any superconducting material, including those that are too brittle to be easily and/or cost effectively formed into superconducting wires.")

As the Examiner suggests on page 15, paragraph 2, in a squirrel cage, it is possible for current to flow in a closed loop. The Examiner apparently recognizes that in a squirrel cage, current can flow across one bar 4, down one end ring 5, back across another bar, and then up the other end ring to its starting point. The Examiner appears to suggest that the current loop defined by these two bars and the end rings form one turn of a "winding." Under this scheme, the squirrel cage would become a "winding" that consists of many circumferentially offset current loops, all joined together at two endpoints (i.e. the end rings).

However, a structure does not become a "winding" simply because it is possible to trace out a closed path for current flow. In virtually all electrical circuits, it is possible to identify numerous closed loops through which current can flow. However, it would stretch credulity to characterize each loop in an electric circuit as a "winding."

A "winding" refers to an elongated conductor formed into a coil having two or more "turns." The turns collectively define a core of the winding. Current flowing in the conductor generates (as does any current) a magnetic field whose field lines enclose the current. In a winding, the conductor guides current so that the field lines from current in each turn of the winding are funneled through the winding's core. As a result, the magnetic field in the core becomes quite high. This is why, for example, windings, and not a squirrel cages, are used to make electromagnets.

The use of the term "winding" for the structure shown in *Higashi* runs afoul of the Examiner's own definition of a winding.<sup>5</sup> The Examiner quotes a dictionary that defines a winding as "one complete turn of something wound." In the case of the *Higashi* squirrel cage, it is unclear precisely what is being wound? Certainly, it cannot be the superconducting material. It is clear from the figures that the superconducting material 13 extends only as far as the end rings 5. Since it is plain from the figures that the superconducting material is not wound, *Higashi* cannot possibly teach a superconducting winding.

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<sup>5</sup> Examiner's Answer, page 15, last paragraph.

These difficult questions are avoided by recognizing that a squirrel cage is fundamentally different from a winding, and that what *Higashi* teaches is a squirrel cage, and not a winding.

#### SUMMARY

For reasons set forth above and in the Appeal Brief, it is apparent that neither *Higashi* nor *Rabinowitz* teaches a rotor with a superconducting winding. As a result, the combination of *Higashi* and *Rabinowitz* also lacks a teaching or suggestion of a rotor having a superconducting winding. For these reasons, and the reasons stated in the Appeal Brief, Applicant submits that the final rejection should be reversed.

No additional fees are believed to be due in connection with the filing of this rebuttal brief. However, to the extent that a fee is due, or if a refund is forthcoming, please adjust our Deposit Account No. 06-1050, referencing attorney docket number "05770-082001."

Respectfully submitted,

Date: March 12, 2003



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